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SITE INDEX CURVES
FOR
SOME FOREST SPECIES
IN THE
EASTERN UNITED STATES



Prepared by
Eastern Region - Forest Service
U. S. Dept. of Agriculture
Upper Darby, Pennsylvania
1965

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Frederick E. Hampf

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FOREWORD

Indices of site quality are important to forest management. They indicate the relationships between productivity and the many environmental factors influencing an ecosystem. Site Index is a single, quantitative expression of the multitude of factors that make up site quality. For a single tree species, variations in height growth due to variations in the site factors have been found to be closely and positively correlated, more so than variations in diameter or volume growth. For this reason, height growth is the factor in common use in this country as an index of site. The height attained by the average dominant and codominant trees at the age of 50 years is generally used in the Eastern United States as the index of site quality and is known as Site Index.

For years, foresters have prepared tables and graphs showing the site index for a specific stand, species, or area. Some of this information is therefore limited in application, and the publications are not generally available to the practicing forester. To make it possible for foresters to have curves for several species under one cover, all available data in the Regional Office was studied and correlated. After consulting with the Northeastern Forest Experiment Station of the U. S. Forest Service and the Northeast Regional Office of the U. S. Soil Conservation Service, figures were prepared showing site index curves for 32 eastern species. Where necessary,



curves were revised to show total age at 50-year base. The only exception is in the use of 30-year base for eastern cottonwood.

These curves are only as accurate in application as the original data on which they are based. They may not fit perfectly in all situations. However, these curves will enable foresters to come up with a reasonable estimate of site index (total height in feet at 50 years of age) from measurements taken on trees which are more than, or less than, 50 years of age.

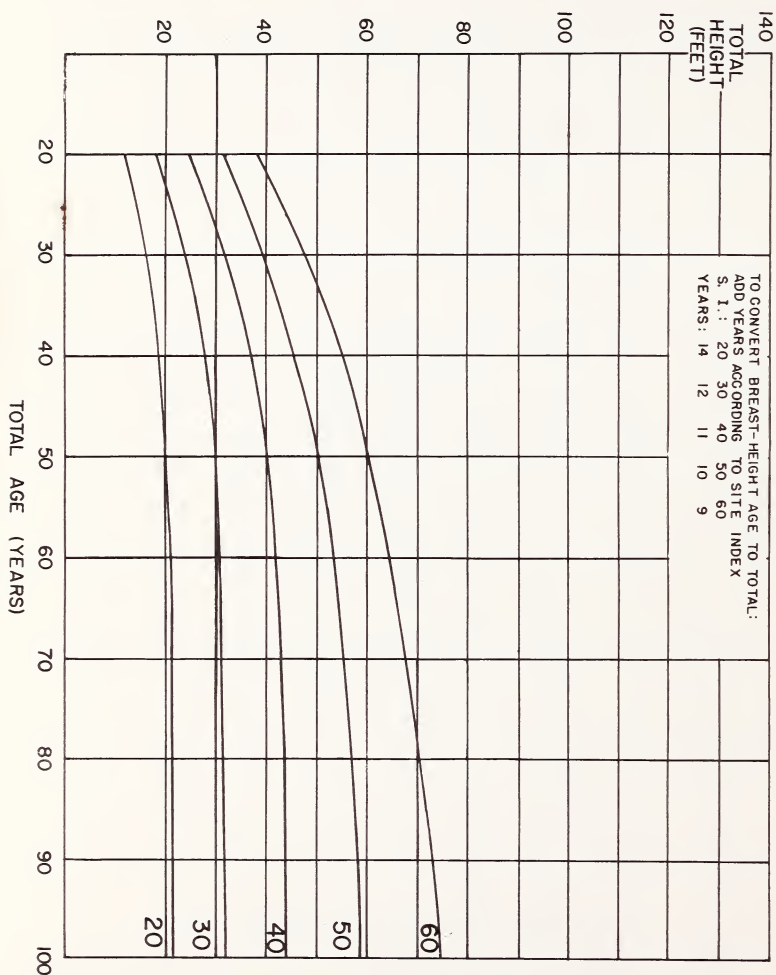
Limit of geographic reliability for the curves is shown at the top of each page. Because of marked differences in growth behavior, curves for more local areas are shown for eastern white pine, sweetgum, and yellow-poplar.

Before determining site index, the average age correction shown for the species should be added to the average breast-height age taken from borings at that point on the sample trees to obtain total age. Actual local age corrections for the species should be used when known. As a rule of thumb, one half of the age correction shown on the page should be added when boring at a stump height of one foot.

The source of information used is shown at the bottom of each page. Where two or more sources are shown, data from the first was used, and the others are listed because of close agreement.



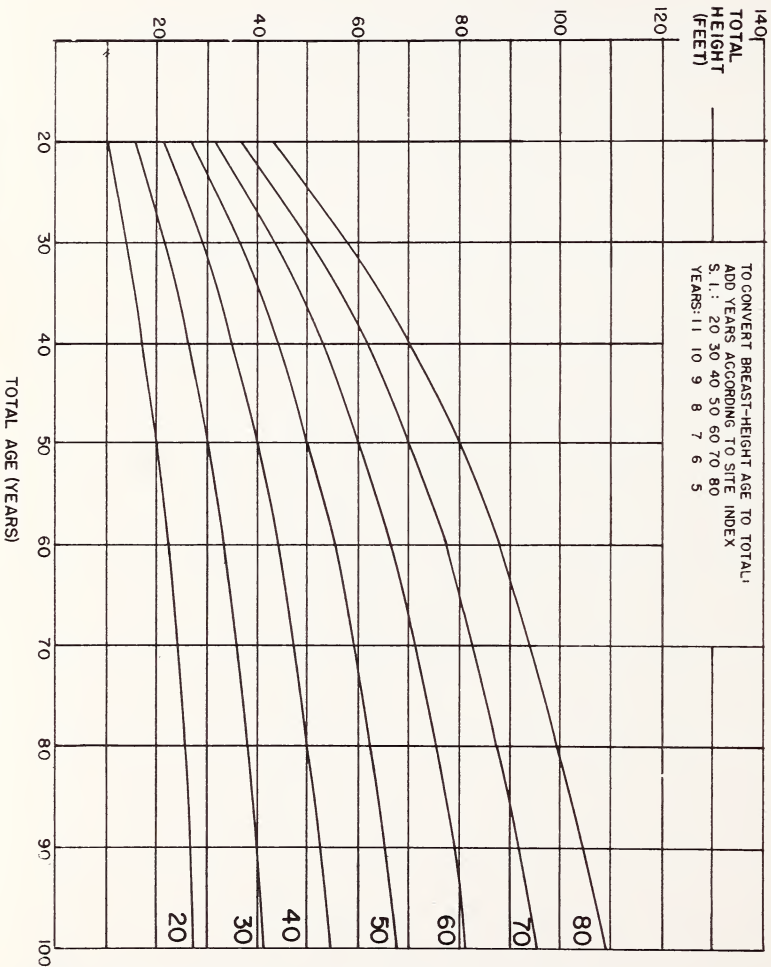
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX
AT 50 YEARS, THROUGHOUT THE TENNESSEE VALLEY.



SOURCE: USDA, SCS, SPARTANBURG, S.C., 1956, BASED ON 271
OBSERVATIONS FROM PLOTS THROUGHOUT TENNESSEE
VALLEY, SUMMER, 1948.



HEIGHT IN FEET OF AVERAGE SECOND-GROWTH DOMINANT TREES,
 BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.

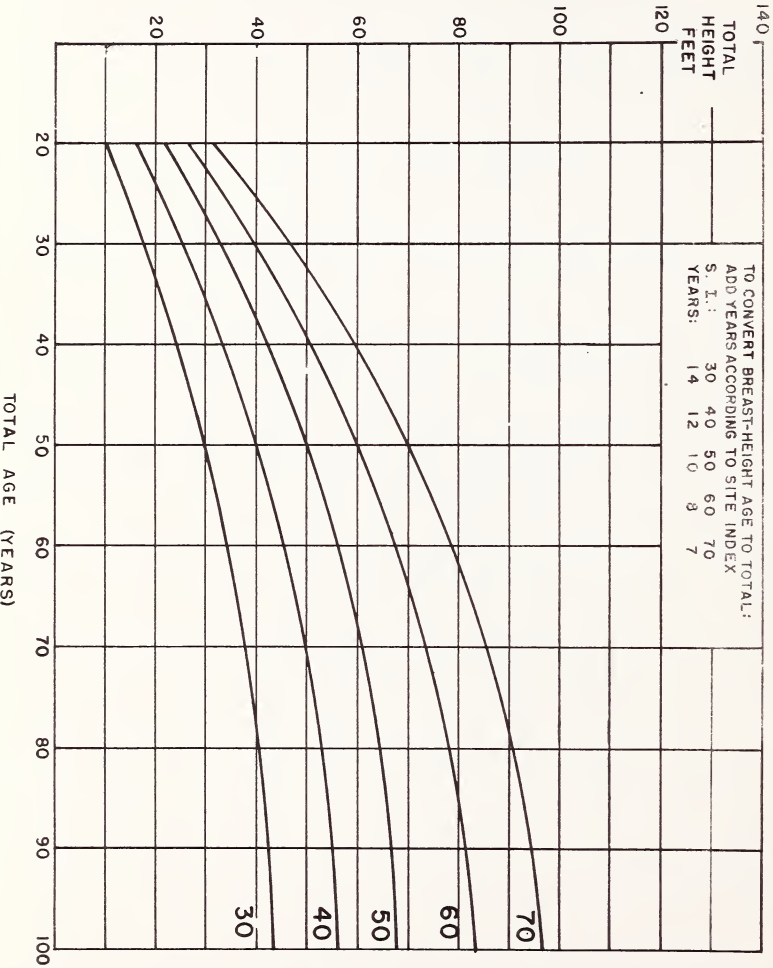


SOURCE: KORSTIAN, C.F., BRUSH, W.D., SOUTHERN WHITE CEDAR,
 U.S.D.A. TECH. BULL. NO. 251, SEPT. 1931.

Figure 2.--ATLANTIC WHITE-CEDAR

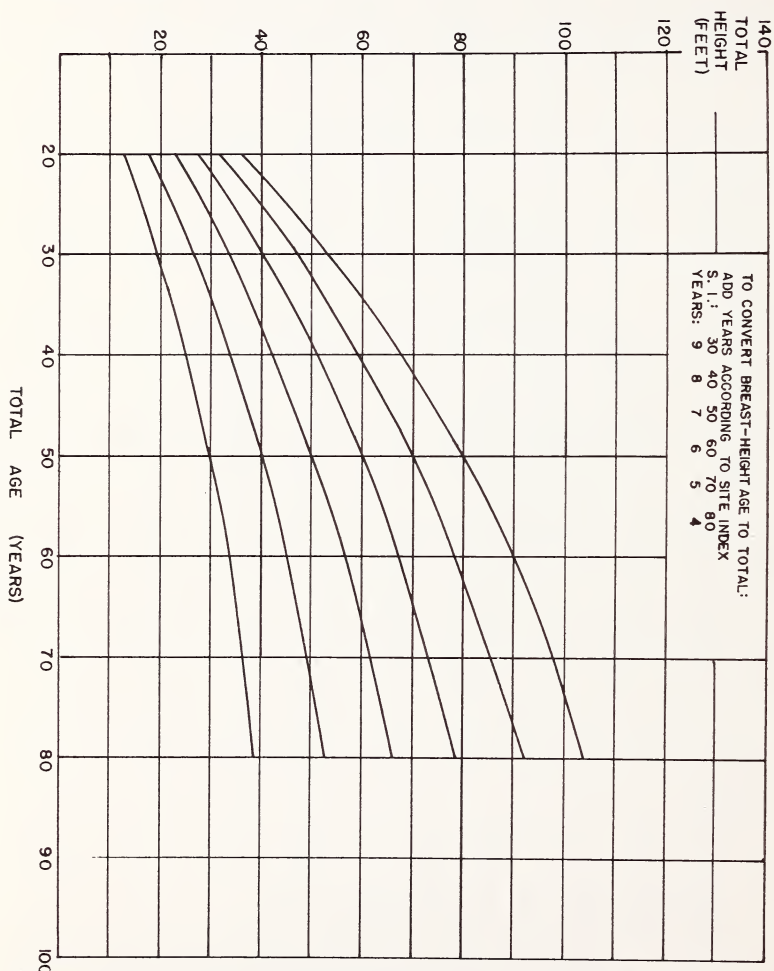


HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES
BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE:MEYER,W.H.,U.S.D.A. TECH.BULL.NO.142,1929.GEVORKIANTZ,S.R.,
LAKES STATES FOR EXP.STA.TECH NOTES NO.465,OCT.1956.

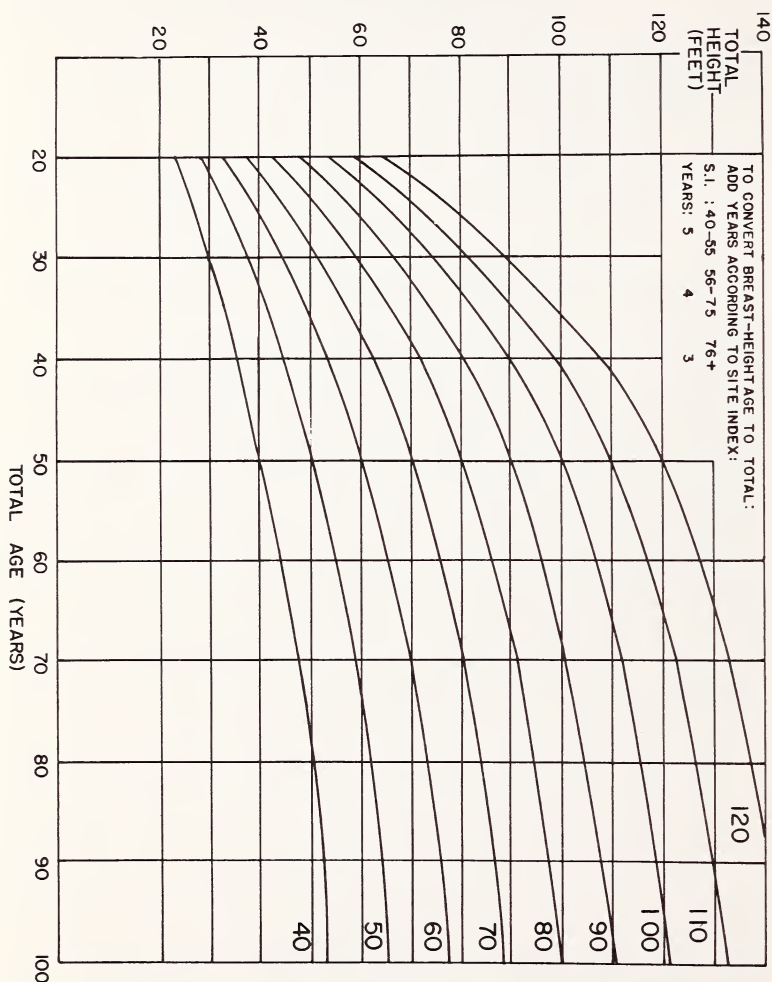
HEIGHT OF AVERAGE DOMINANT & CODOMINANT TREES IN EVEN-
AGED STANDS, BY SITE INDEX AT 50 YEARS, IN LAKE STATES.



SOURCE: GEVORKIANTZ, S.R., LAKE STATES FOR. EXP. STA. TECH. NOTES
NO. 463, OCT. 1956. EYRE, F.H., & LE BARRON, R.K., U.S.D.A.
TECH. BULL. NO. 863, 1944. STERRETT, W.D., U.S.D.A. BULL
NO. 820, MAY, 1920. WACKERMAN, A.E., ZON, R., WILSON, F.G.,
U. OF WISCONSIN RES. BULL. NO. 90, MARCH, 1929.



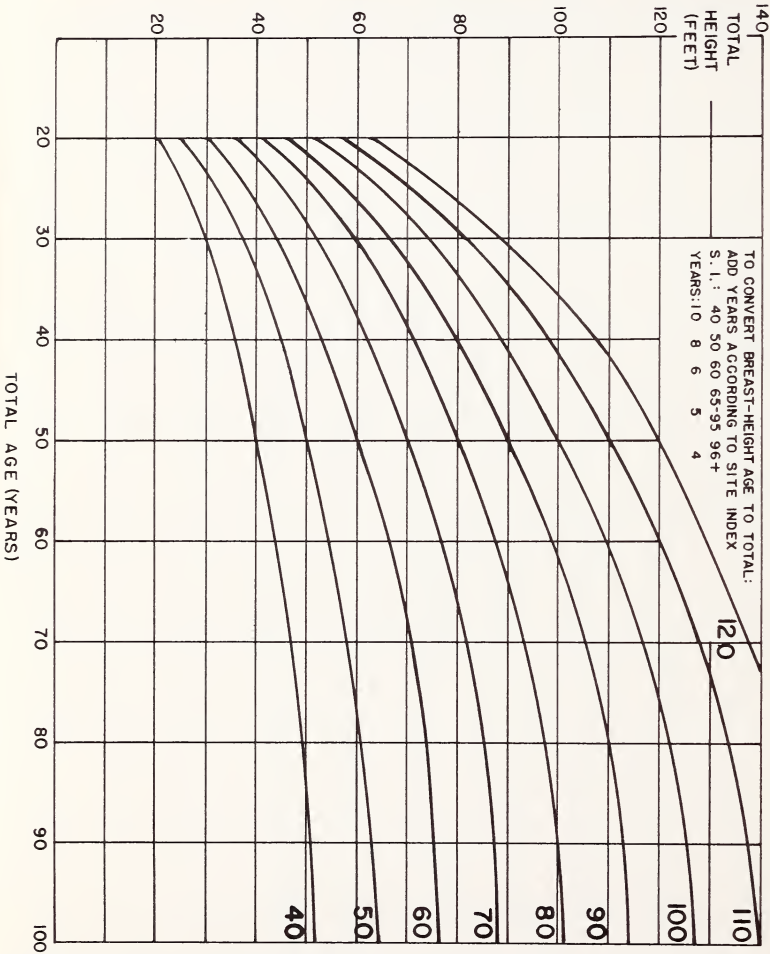
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT
50 YEARS, COASTAL & PIEDMONT AREAS, SOUTHEASTERN U.S.



SOURCE: VOLUME, YIELD & STAND TABLES FOR SECOND-GROWTH
SOUTHERN PINES, U.S. DEPT. AGR. MISC. PUBL. NO. 50 (1929).
REVISED BY COILE & SCHUMACHER, JOUR. OF FOR., JUNE 1953.



HEIGHT IN FEET OF SECOND GROWTH DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.

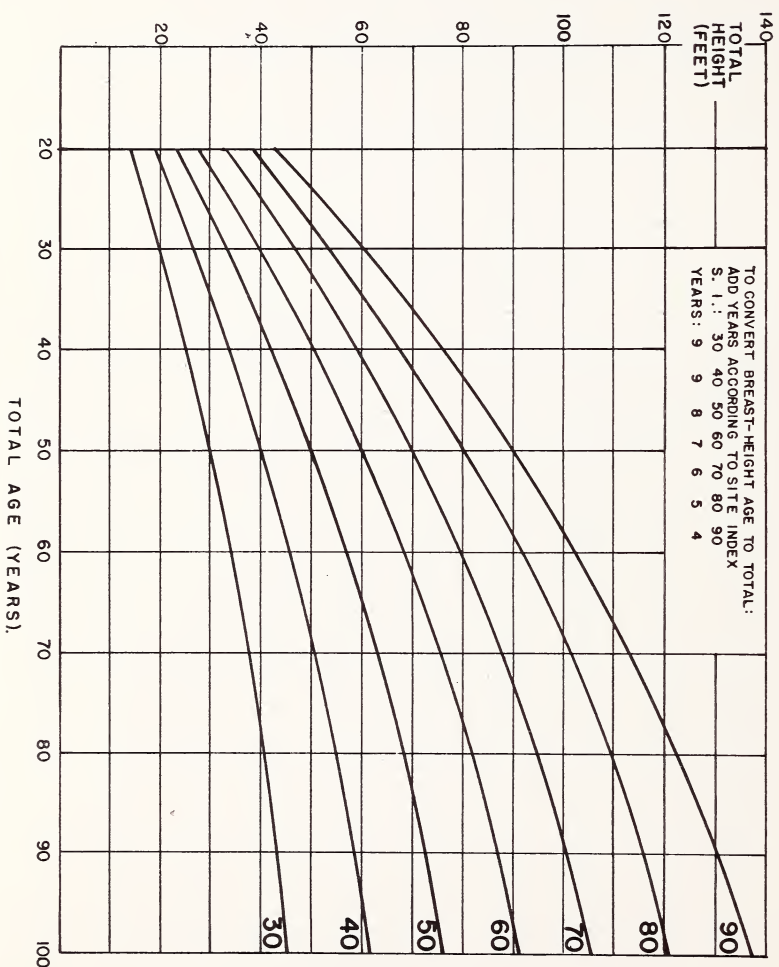


SOURCE: U.S.D.A. MISC. PUBL. NO.50, SEPT. 1929.
 CRUIKSHANK, J.W., S.E. FOR EXP. STA. RES. NOTES NO.50, JAN. 1954.
 (ABOVE CURVES AGREE CLOSELY WITH THOSE PREPARED BY
 SCHUMACHER, F.X. & COILE, T.S. PUBLISHED JAN. 1960.)

Figure 6:-LONGLEAF PINE



HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.

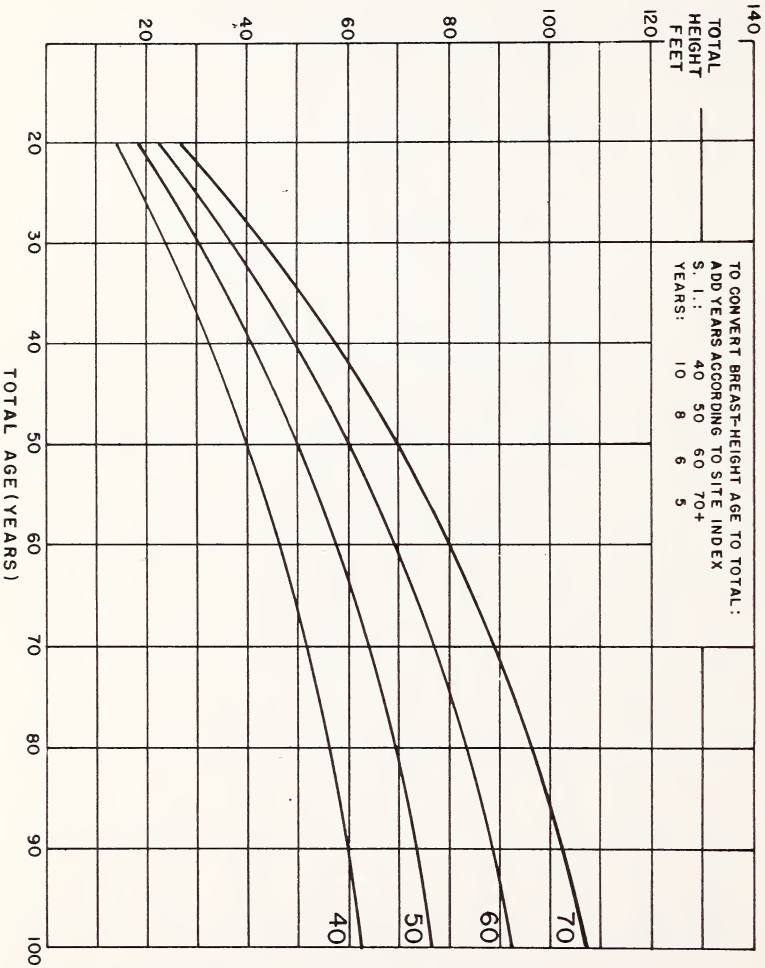


SOURCE: ILLICK, J.S. & AUGHANBAUGH, J.E., PITCH PINE IN PENNSYLVANIA, PA. DEPT. OF FORESTS & WATERS RES. BUL. NO. 2, 1930.

Figure 7.--PITCH PINE



HEIGHT IN FEET OF EVEN-AGED AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN THE LAKE STATES.

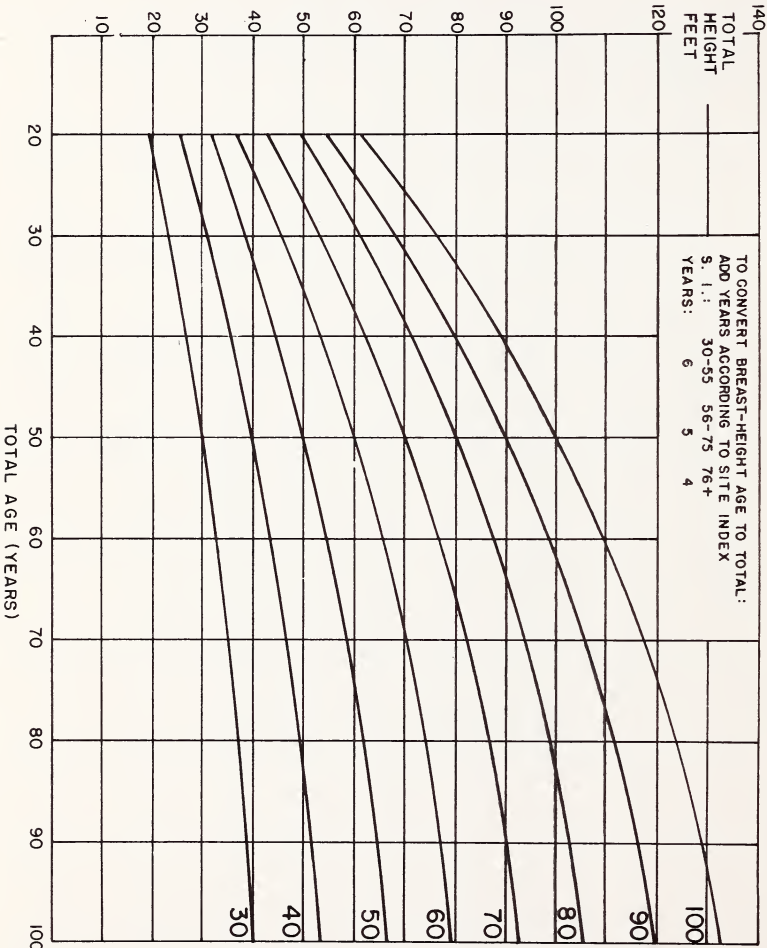


SOURCE: GEVORKIANCIE, S.R., LAKE STATES FOR EXP. TECH. NOTES NO. 484, APRIL 1957.
 EYRE, F.H. & ZEHNGRAFF, U.S.D.A. CIR. 778, MAY 1948.
 BUCKMAN, R.E., U.S.D.A. TECH. BULL. NO. 1272, OCT. 1962.

Figure 8.--RED PINE



HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS IN NATURAL RANGE.

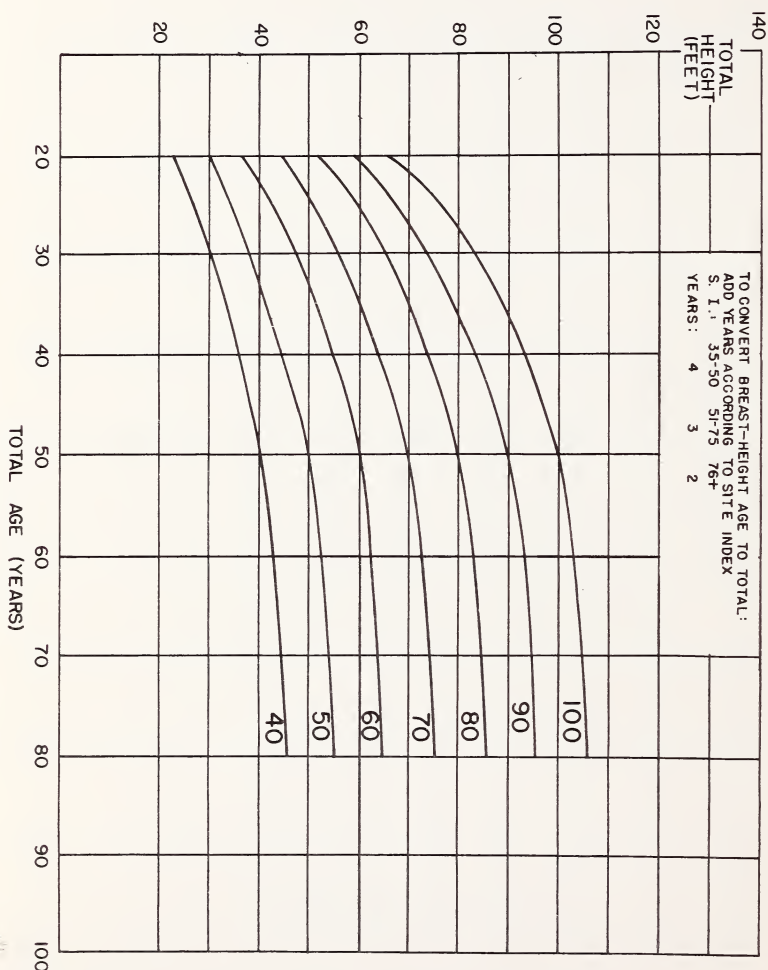


SOURCE: BASED ON HEIGHT GROWTH DATA IN U.S.D.A. PUBL.#50(1929),
 REVISED BY COILE & SCHUMACHER, JOUR. OF FORESTRY,
 JUNE 1953.

Figure 9.--SHORTLEAF PINE



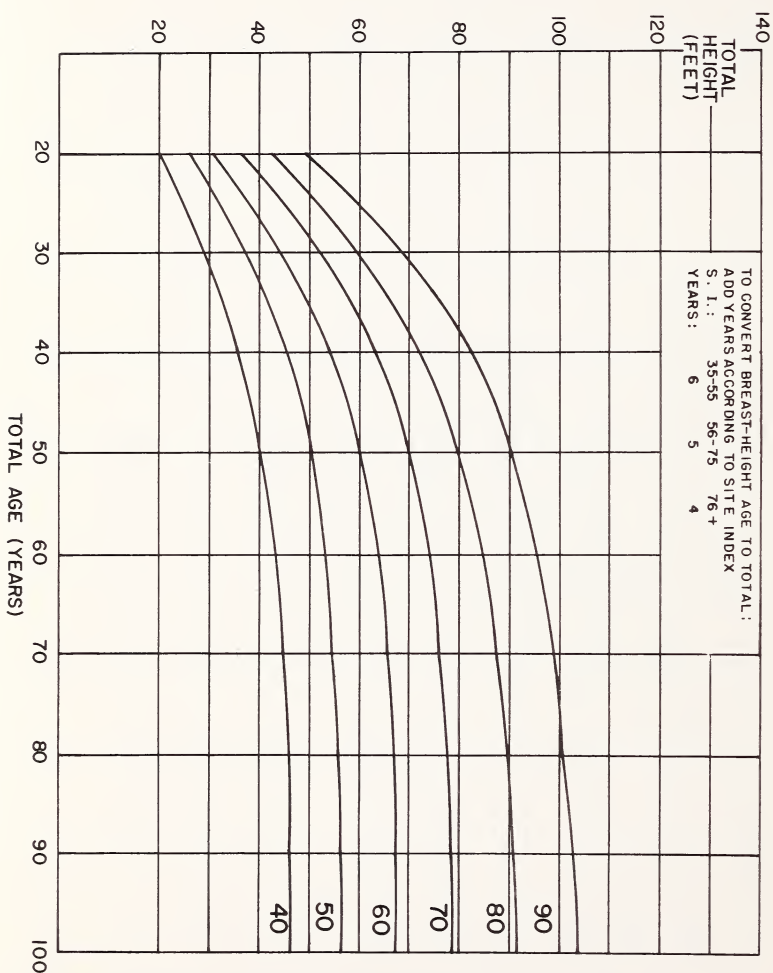
HEIGHT IN FEET OF SECOND-GROWTH DOMINANT TREES, BY SITE INDEX
AT 50 YEARS, IN NATURAL RANGE.



SOURCE: U.S.D.A. MISC. PUBL. NO. 50, SEPT. 1929. CRUIKSHANK,
J.W., S.E. FOR. EXP. STA. RES. NOTES NO. 50, JAN. 1954.
(ABOVE CURVES AGREE CLOSELY WITH THOSE PRE -
PARED BY SCHUMACHER, F.X. & COILE, T.S., PUBLISHED
JAN. 1960.



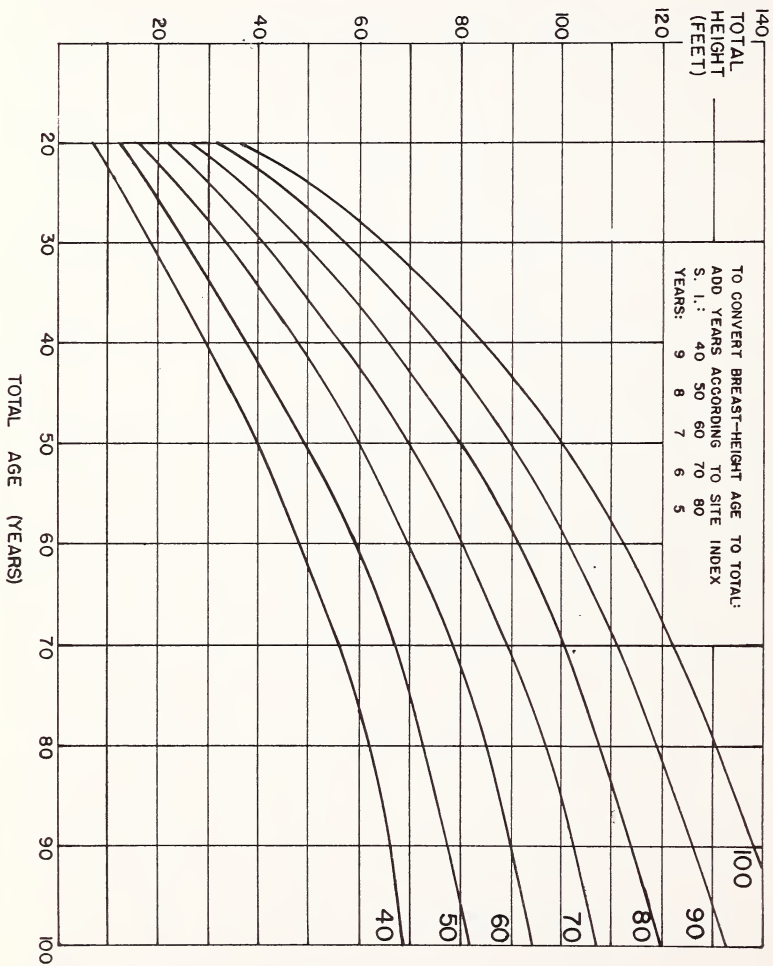
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX
AT 50 YEARS, IN THE EASTERN U.S.



SOURCE: CHAIKEN, L.E., & NELSON, T.C., S.E. FOREST EXP. STA.
RESEARCH NOTES NO. 135 NOV. 1959. N.C. STATE
COLLEGE TECH. BULL. 100, '58.

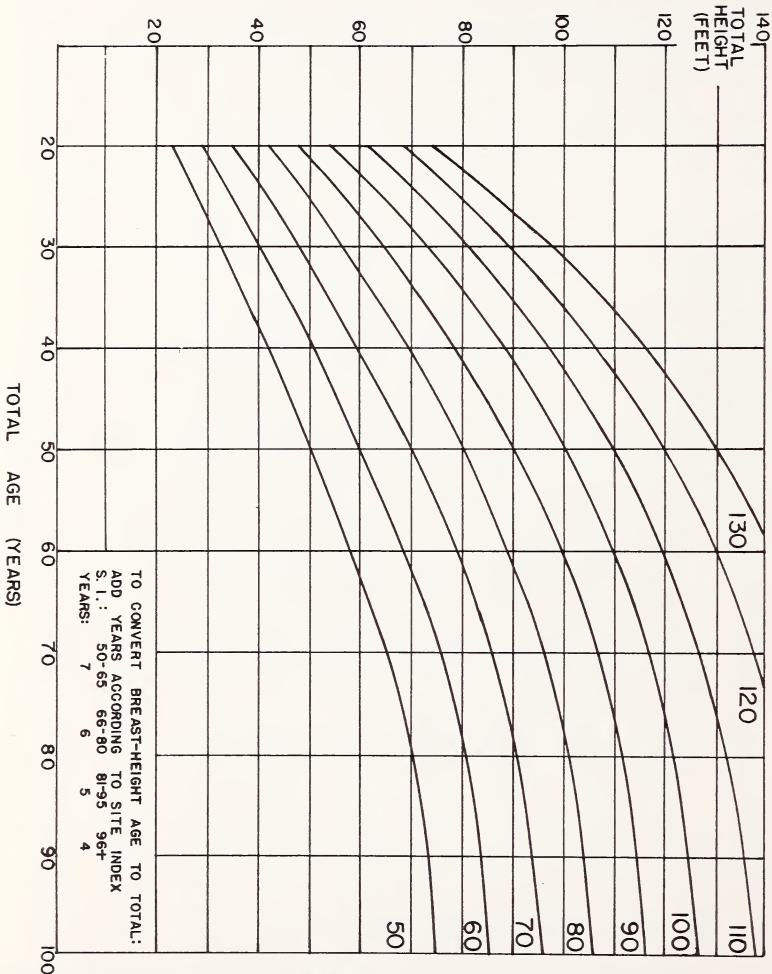


HEIGHT: IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN NEW ENGLAND & MIDDLE ATLANTIC STATES.



SOURCE: FROTHINGHAM, E. H., U. S. D. A. BULL. NO. 13, 1914.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY
SITE INDEX AT 50 YEARS, IN THE SOUTHERN APPALACHIANS.

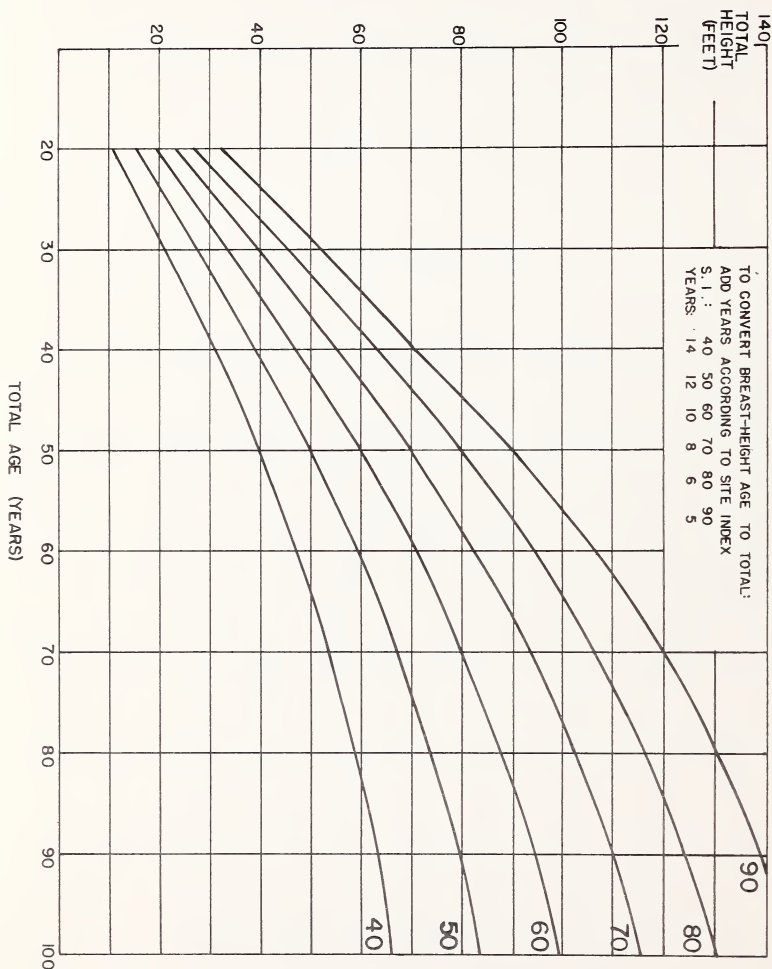


SOURCE: DOOLITTLE, W.T. & VIMMERSTEDT, J.P., S.E. FOR. STA.
RES. NOTES NO. 141, MARCH 1960.

Figure 13.--EASTERN WHITE PINE

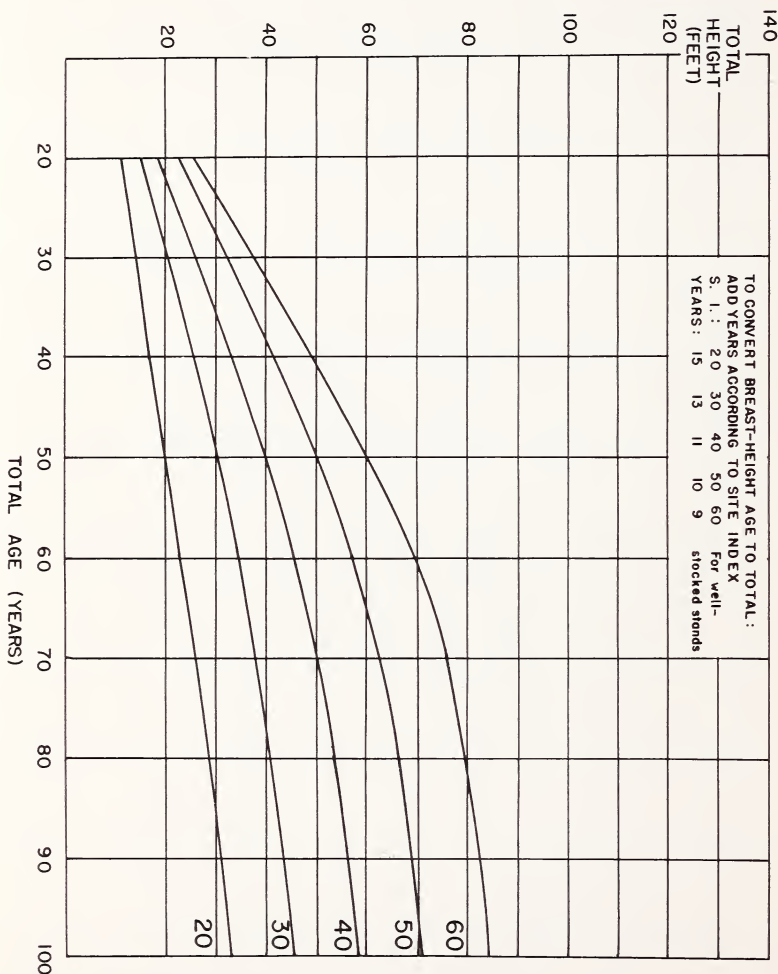


HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY
SITE INDEX AT 50 YEARS, IN THE LAKE STATES.



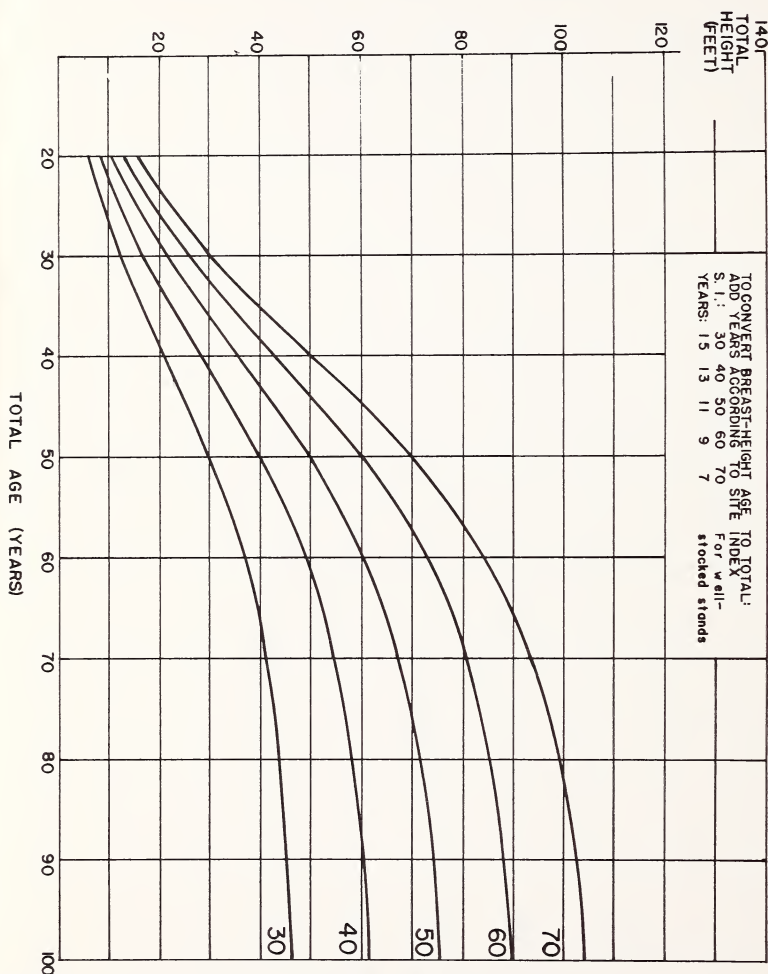
SOURCE: GEVORKIANTZ, S.R., LAKE STATES FOR EXP. STA. TECH
NOTES NO. 483, APRIL 1957.

HEIGHT IN FEET OF AVERAGE DOMINANT TREES IN EVEN-AGED STANDS, BY SITE INDEX AT 50 YEARS, IN LAKE STATES.



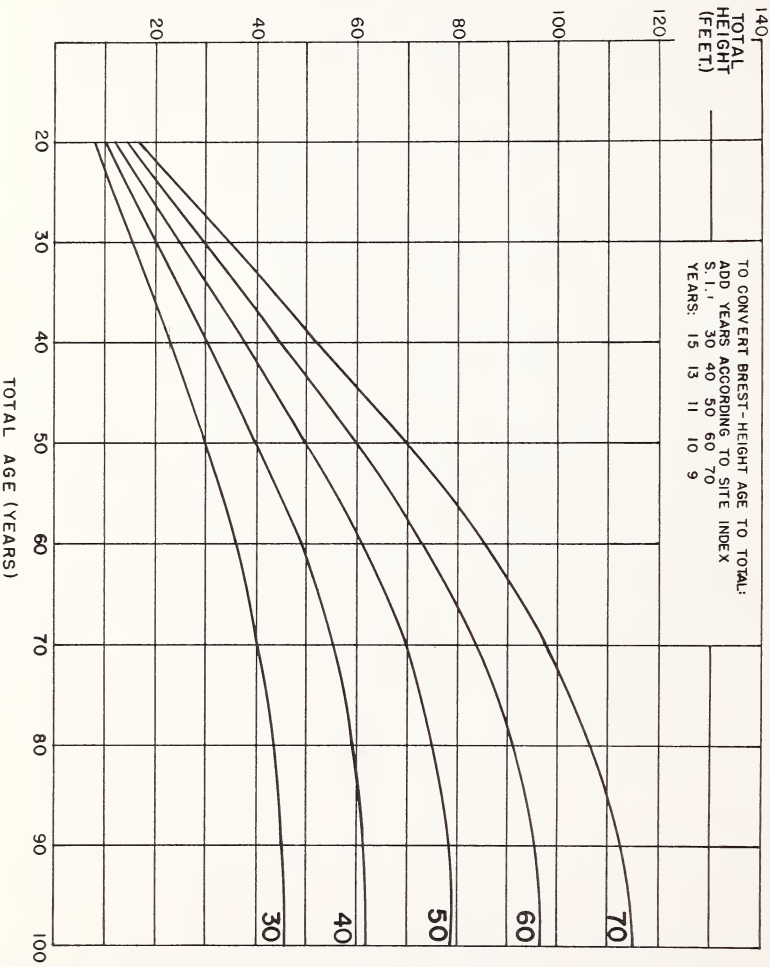
SOURCE: BOWMAN, A.B., MICH. AGR. EXP. STA. TECH. BULL. NO. 188, 1944.
 FOX, G.D. & KRUSE, G.W., JOURNAL OF FORESTRY 37:565-567,
 1939. LEBARRON, R.K., U.S.D.A. CIRCULAR NO. 791, OCT. 1948.
 MILLAR, J.B., FORESTRY CHRON. 15:93-96, 1939.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES IN
EVEN-AGED STANDS, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: MEYER, W.H., U.S.D.A. TECH. BULL. NO. 142, NOV. 1929.
(REVISED TO 50-YEAR AGE FROM 65 YEARS)

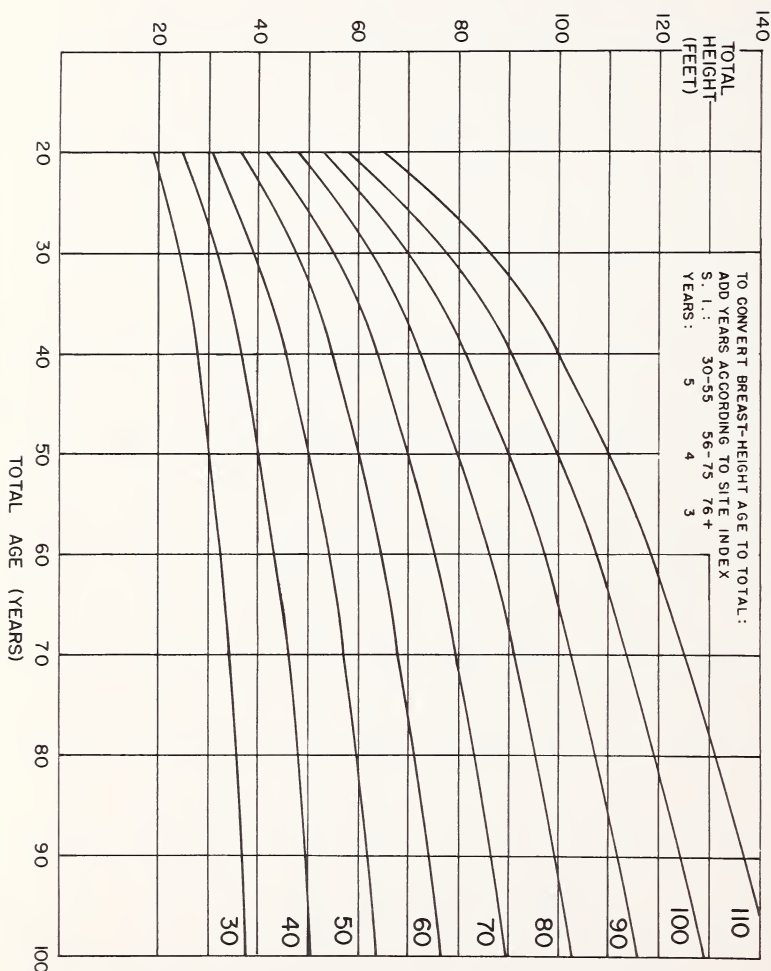
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, IN EVEN-AGED STANDS, BY SITE INDEX AT 50 YEARS, IN NATURAL RANGE.



SOURCE: W.H. MAYER, U.S.D.A. TECH. BULL. NO. 142, NOV. 1929.
 (REVISED TO 50-YEAR AGE FROM 65 YEARS.)

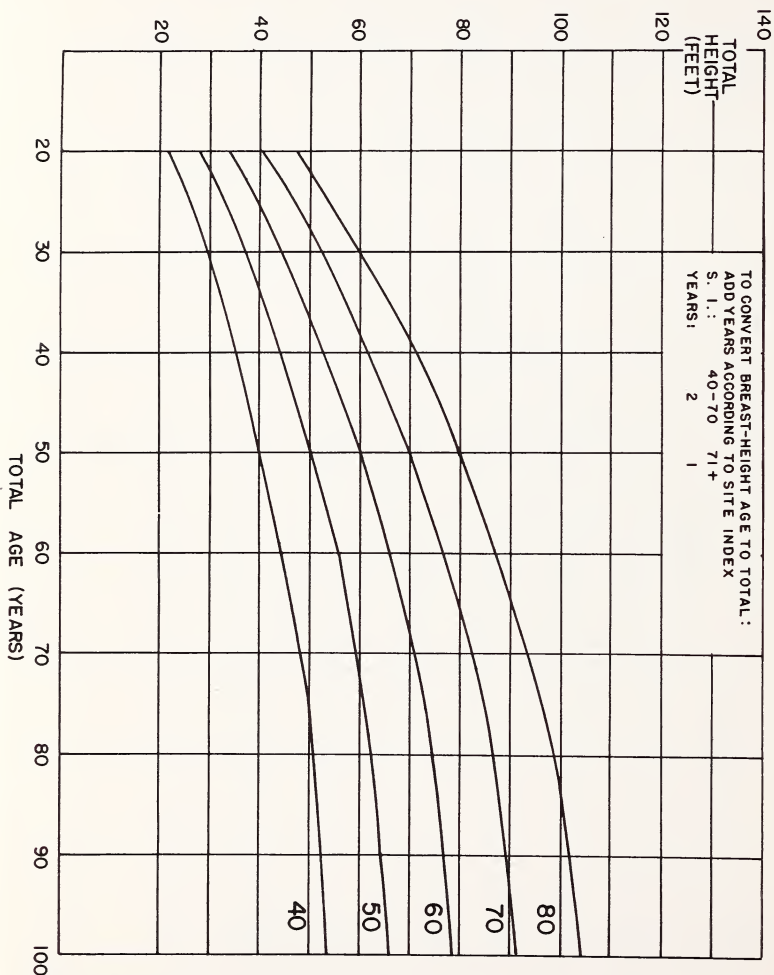
Figure 17. ---WHITE SPRUCE

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES,
BY SITE INDEX AT 50 YEARS, IN VERMONT.



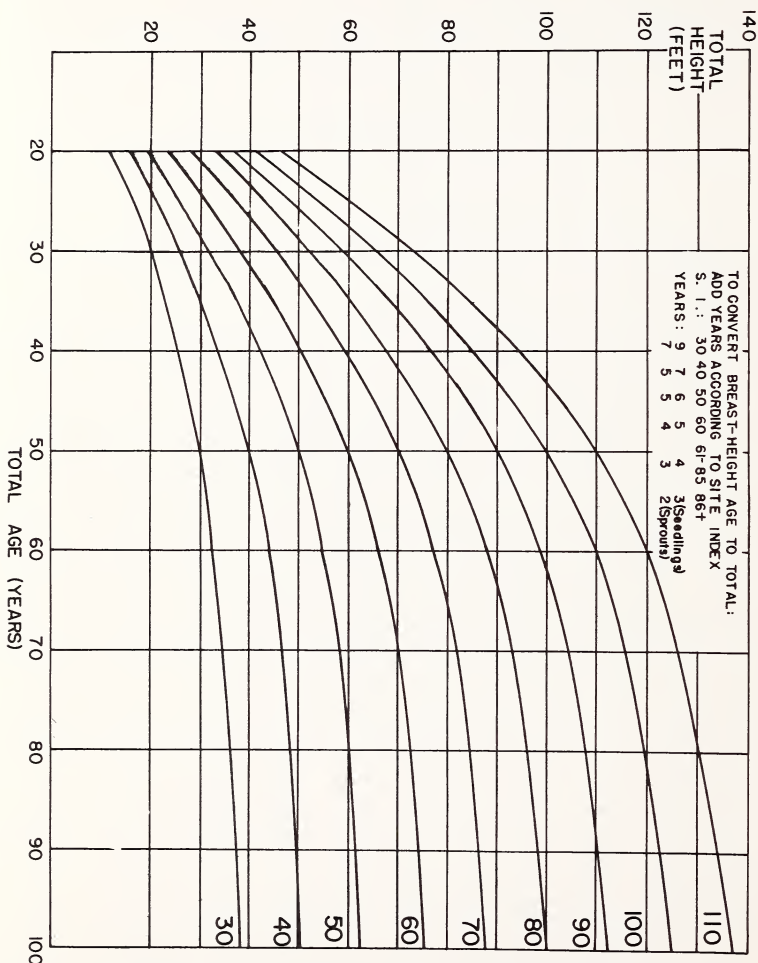
SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS & B.W. POST, BULL. 629, AGR. EXP. STA. U. OF VERMONT & STATE AGRIC. COLLEGE, AUGUST, 1962. (CURVES AGREE CLOSELY WITH THOSE PREPARED BY VERMONT FOREST SERVICE-1957, FARRINGTON & HOWARD)

HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX
AT 50 YEARS, IN LAKE STATES.



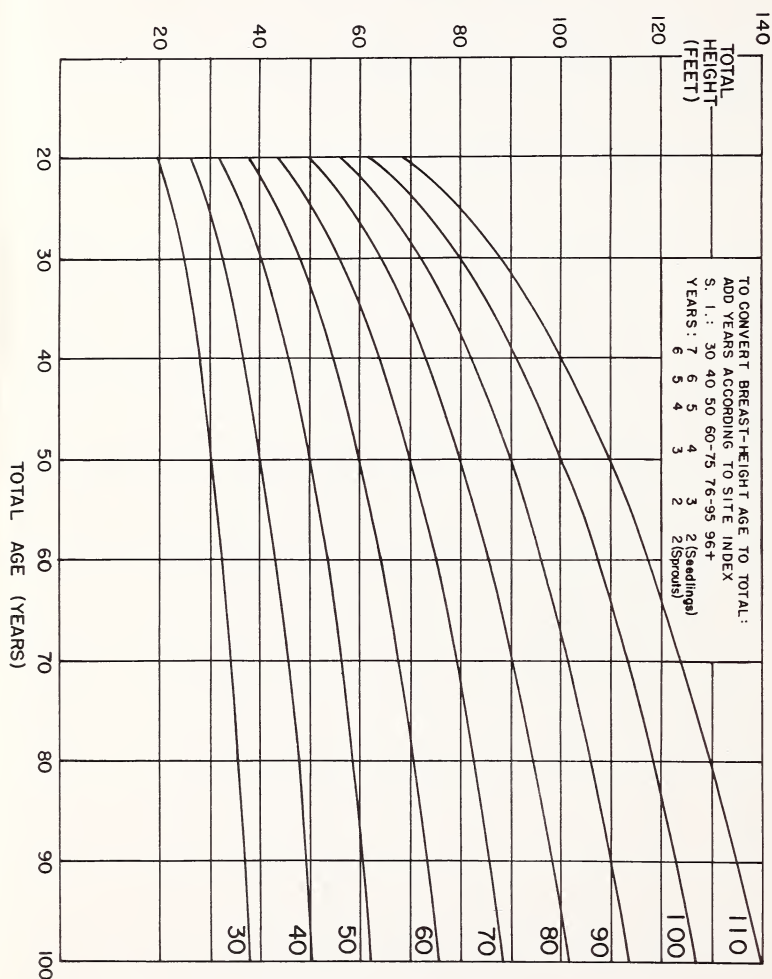
SOURCE: GEVORKIANTZ, S.R., LAKES STATES FOREST EXP. STA., TECH.
NOTES NO. 464 OCT. 1956.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY
SITE INDEX AT 50 YEARS, IN THE NORTHEAST.



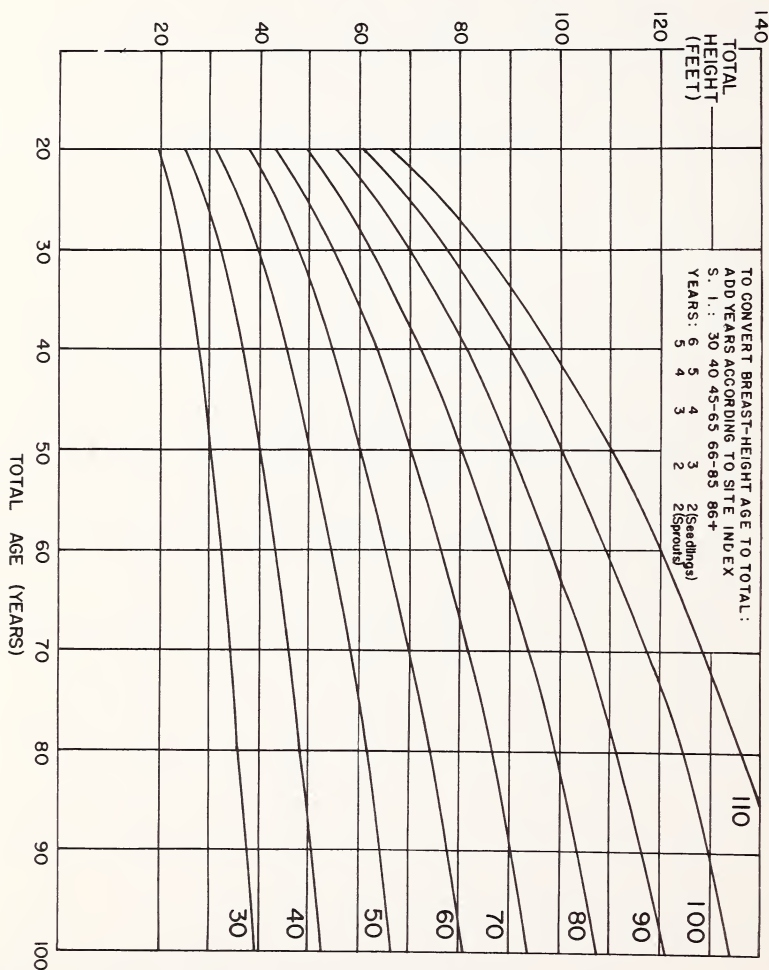
SOURCE: CONSTRUCTED FROM UNPUBLISHED DATA, N.E. FOR. EXP.
STA., UPPER DARBY, PA.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES,
BY SITE INDEX AT 50 YEARS, IN EASTERN U.S.



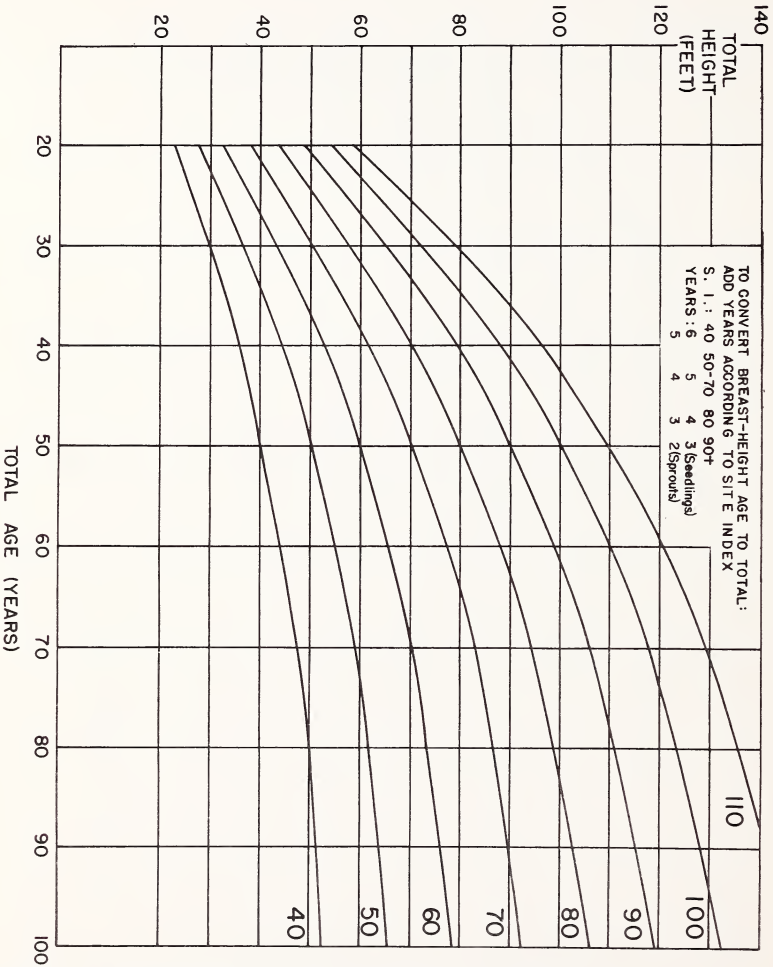
SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS & B.W. POST, BULL. 629, AGR. EXP. STA. U. OF VERMONT & STATE AGRIC. COLLEGE, AUGUST, 1962. COOLEY, J.H., LAKE STATES FOR. EXP. STA. TECH. NOTES NO. 541, OCT. 1958.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES,
BY SITE INDEX AT 50 YEARS, IN VERMONT.



SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS &
B.W. POST, BULL. 629 AGR. EXP. STA., U. OF VERMONT & STATE
AGR. COLLEGE, AUGUST, 1962.

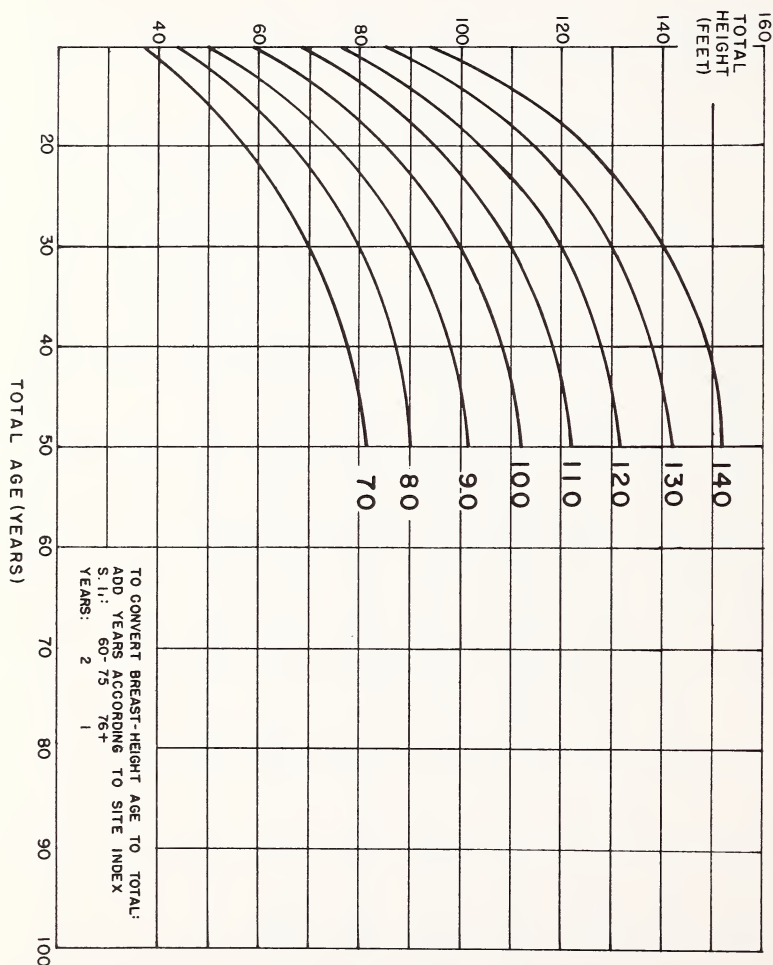
HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX
AT 50 YEARS, IN THE NORTHEAST.



SOURCE: PREPARED FROM A THESIS FOR GRADUATE DEGREE BY S.E.
DEFLER, N.Y. STATE COLLEGE OF FORESTRY, 1937.

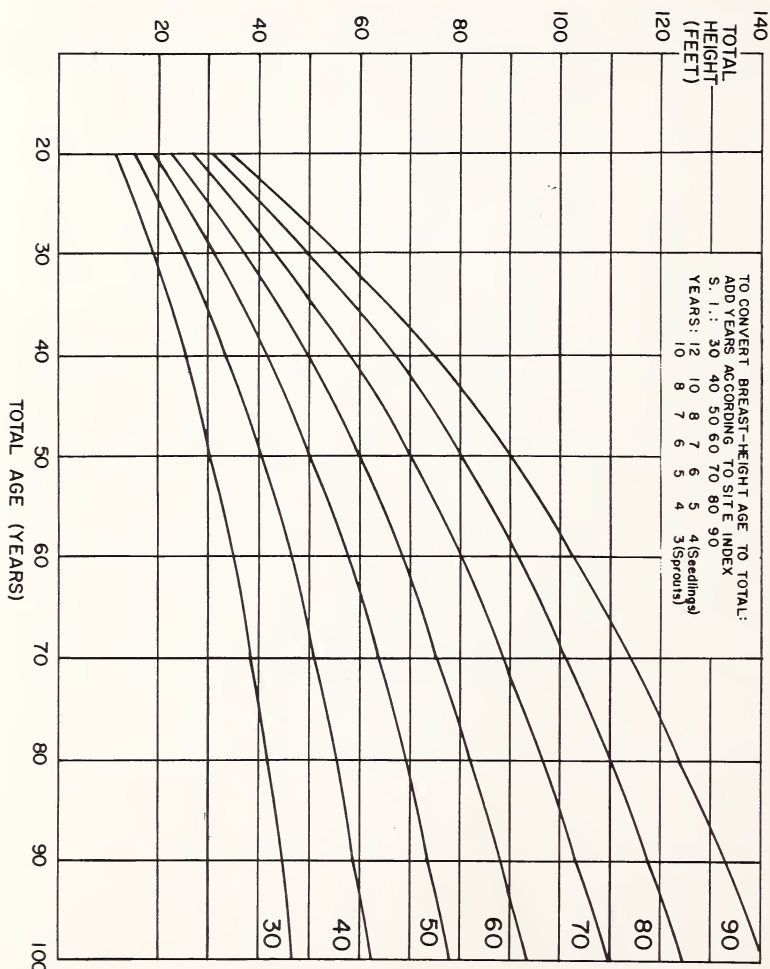
Figure 23.--BLACK CHERRY

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 30 YEARS, IN MISSISSIPPI VALLEY STATES.



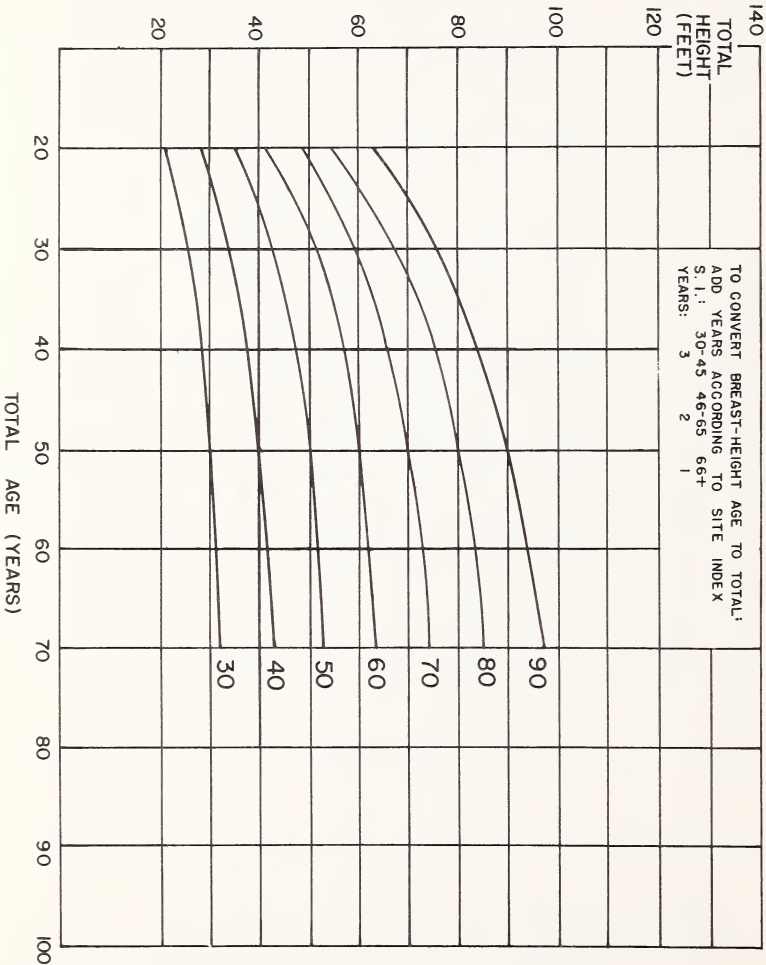
SOURCE: BROADFOOT, W.M., S.F.E.S. OCCAS. PAPER NO. 178, 1960. WHEN REVISED TO 30 YEARS FROM 25 YEARS, THE DATA PUBLISHED BY NEEBE, D.J. & BOYCE, S.G., C.S.F.E.S. STA. NOTE NO. 126 1959 FITS ABOVE CURVES CLOSELY EXCEPT IN AGES BETWEEN 10 & 30 YEARS FOR CURVES "100" AND HIGHER.

HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX
AT 50 YEARS, IN EASTERN UNITED STATES.



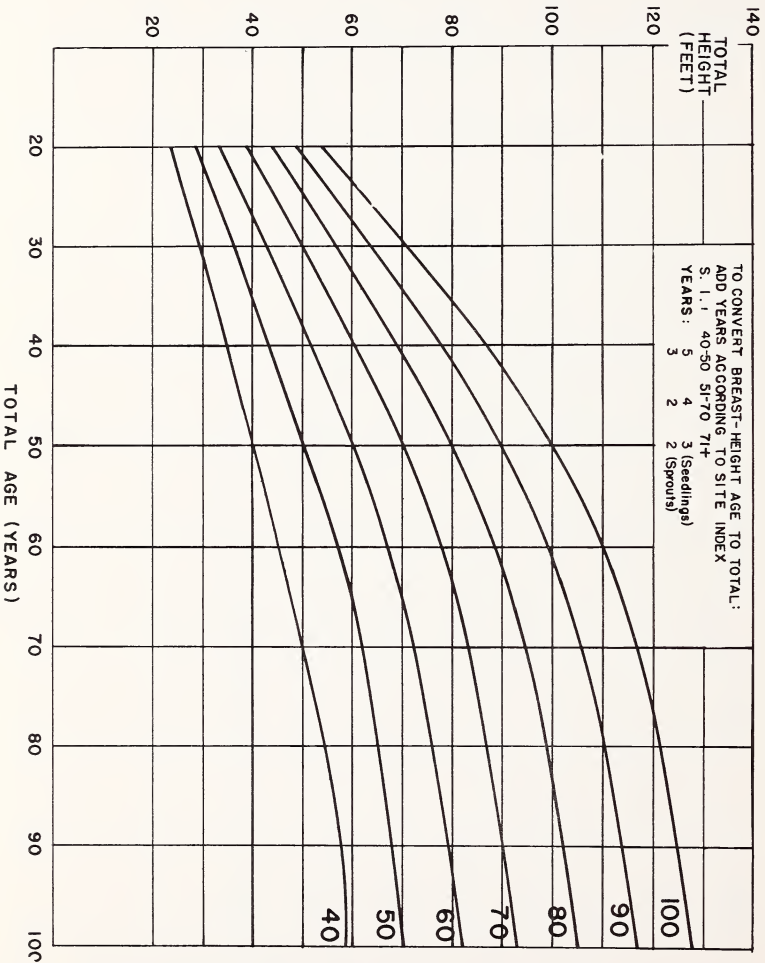
SOURCE: BOISEN, A.T. & NEWLIN, J.A., THE COMMERCIAL HICKORIES,
USDA, FOREST SERVICE BULL. NO. 80, 1910.

HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX
AT 50 YEARS, IN CENTRAL STATES REGION.



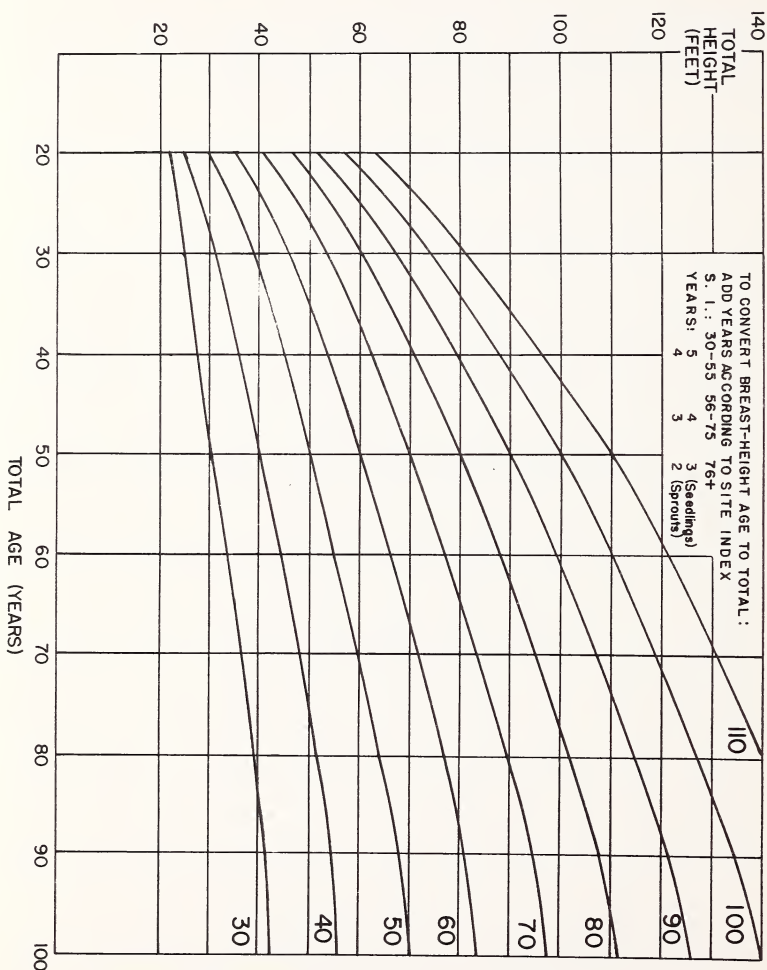
SOURCE: KELLOGG, L.F., SITE INDEX CURVES FOR PLANTATION BLACK LOCUST, CENTRAL STATES REGION, CENTRAL STATES EXP. STA. NOTE 36, 1939.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN NEW ENGLAND & N.Y.



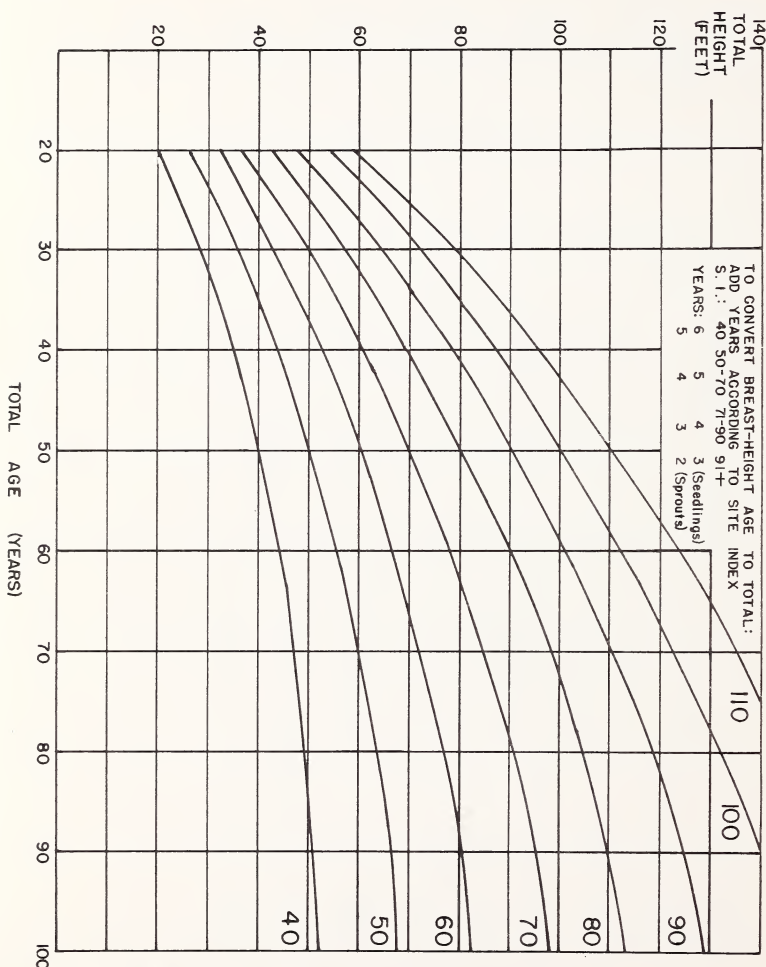
SOURCE : CONSTRUCTED FROM DATA REPORTED BY R.W. FOSTER,
FOREST SCIENCE, VOL. 5, NO. 3, SEPT, 1959.
(FOR TREES OF SEEDLING ORIGIN ONLY)

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY
SITE INDEX AT 50 YEARS, IN VERMONT.



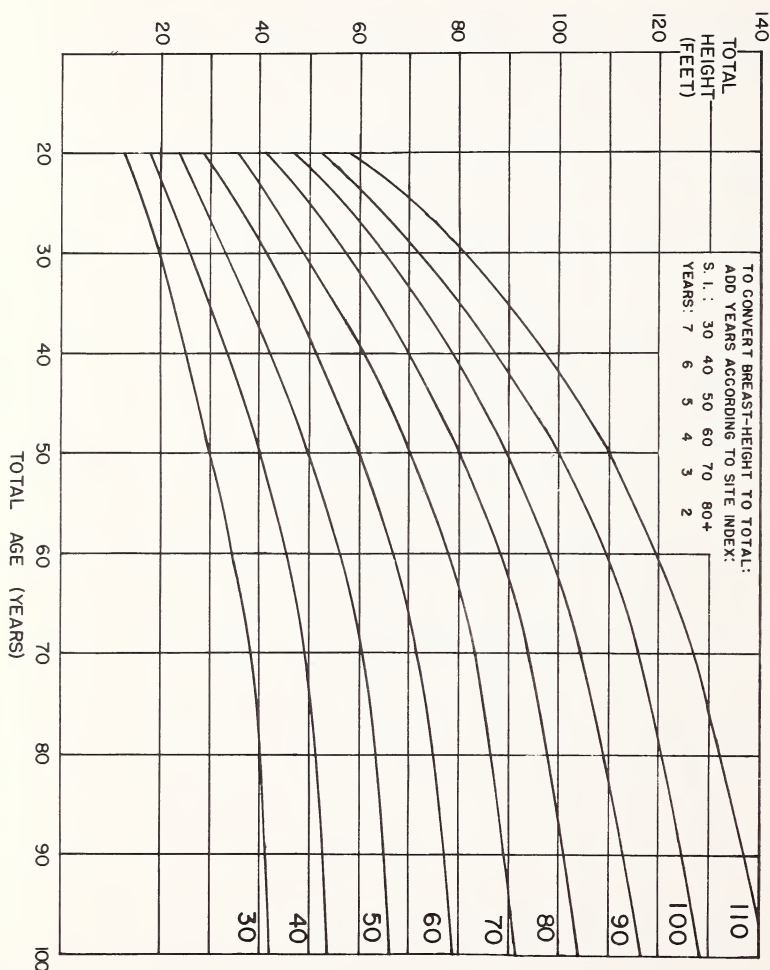
SOURCE: CONSTRUCTED FROM FORMULA DEVELOPED BY R.O. CURTIS
& B.W. POST, BULL. 629, AGR. EXP. STA., U. OF VERMONT &
STATE AGR. COLLEGE, AUGUST, 1962.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN EASTERN UNITED STATES.



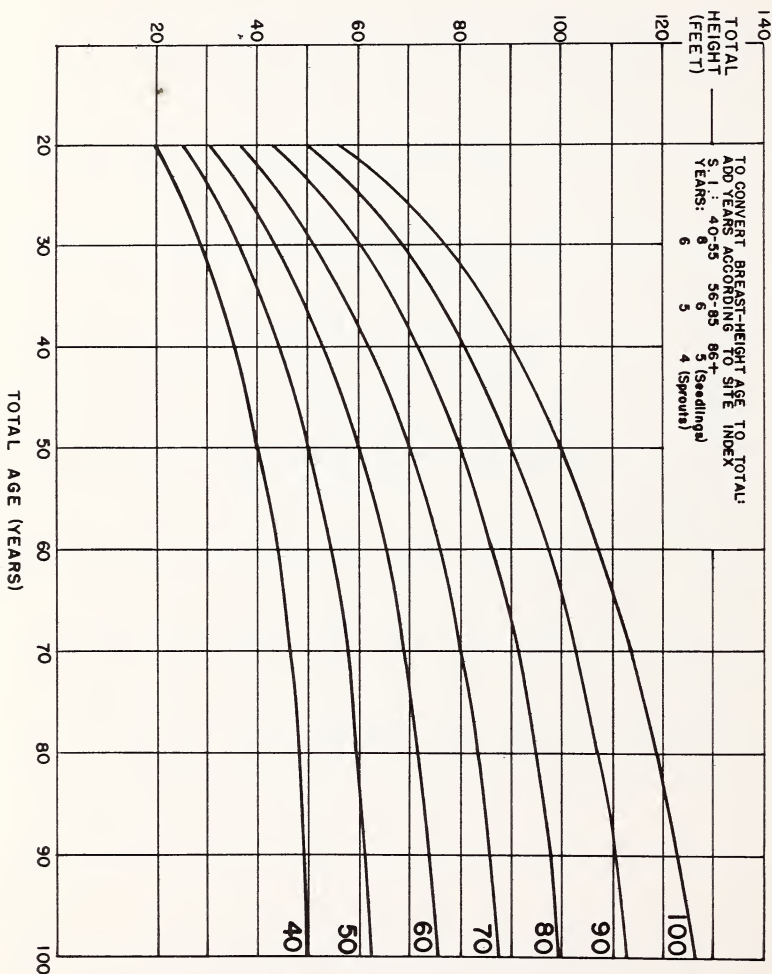
SOURCE: BASED ON DATA FROM GEVORKIANTZ, S.R., LAKE STATES EXP. STA. TECH. NOTE NO. 485, 1957. OLSON, D.J., S.E.F.E.S. RES. NOTES NO. 125, 1959.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES
BY SITE INDEX AT 50 YEARS, IN OAK-HICKORY FORESTS.



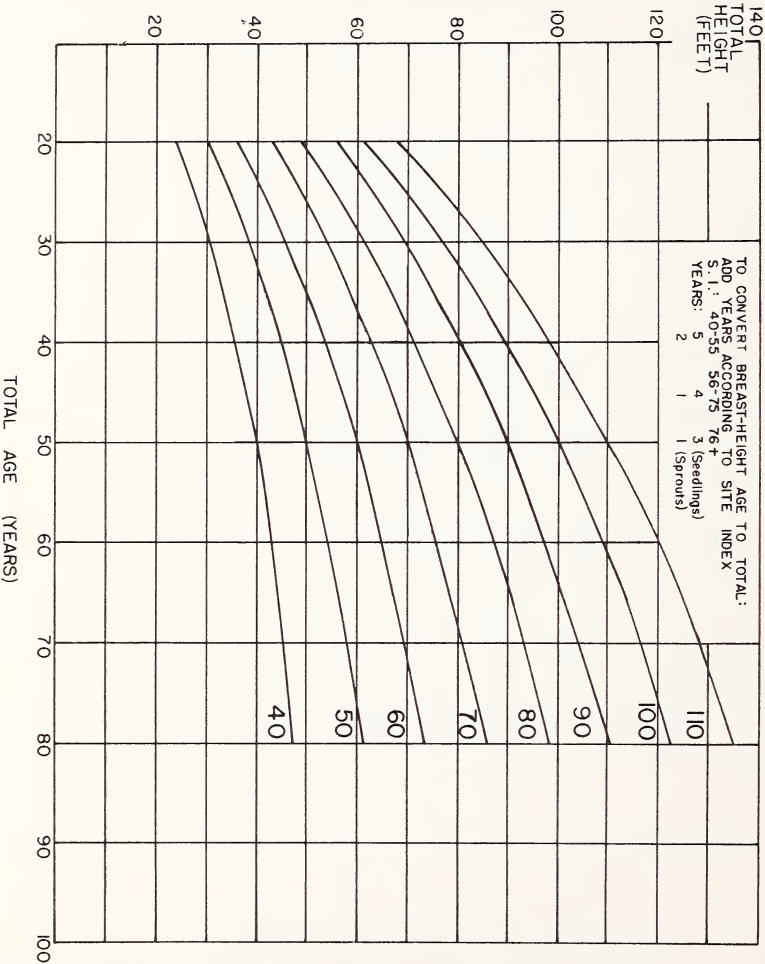
SOURCE: G.L. SCHNUR, YIELD STAND, & VOLUME TABLES FOR
EVEN-AGED UPLAND OAK FORESTS, U.S.D.A., TECH.
BULL. NO. 560 (1937). D.J. OLSON, JR., S.E. FOREST
EXP. STA. RESEARCH NOTES NO. 125 APRIL 1959.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES,
BY SITE INDEX AT 50 YEARS, IN SOUTHEASTERN U. S.



SOURCE: BASED ON DATA FROM OLSON, D. J., S.E.F.E.S. RES. NOTES NO. 125, 1959.

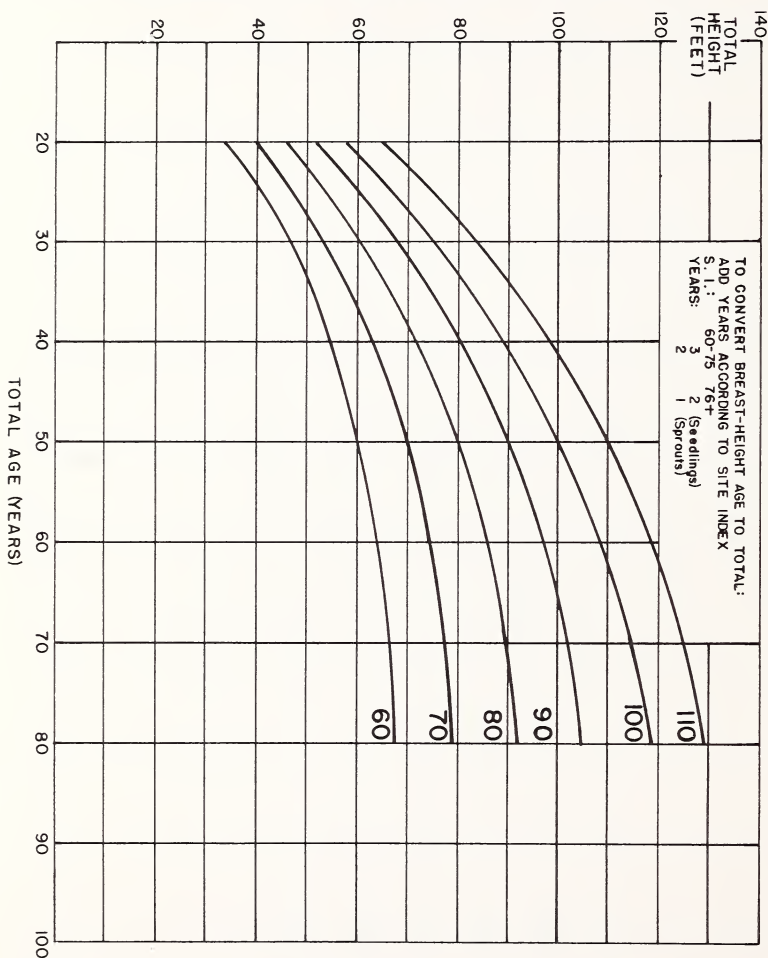
HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN VIRGINIA, MARYLAND, NEW JERSEY & NORTHWARD.



SOURCE: TRENK,FB., "SWEETGUM IN MARYLAND", U. OF MD. & MD. STATE DEPT. OF FORESTRY,1929.

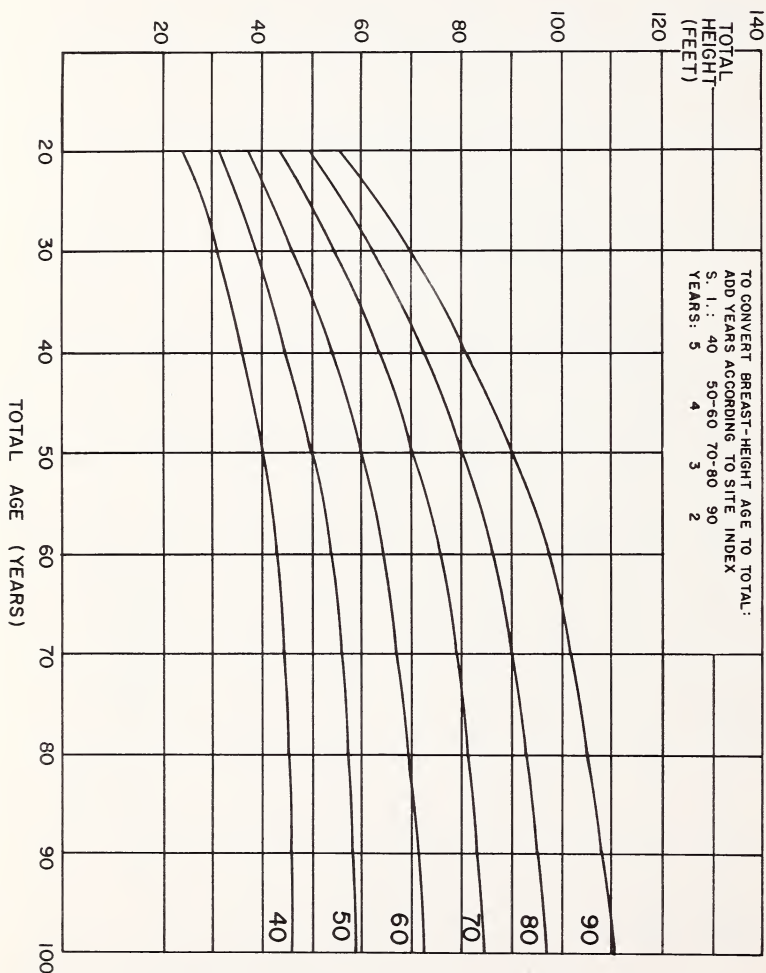
Figure 32.--SWEETGUM

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES,
BY SITE INDEX OF 50 YEARS, IN WEST VIRGINIA, IN STATES OF
OHIO & MISSISSIPPI VALLEYS, AND SOUTHEASTERN STATES.



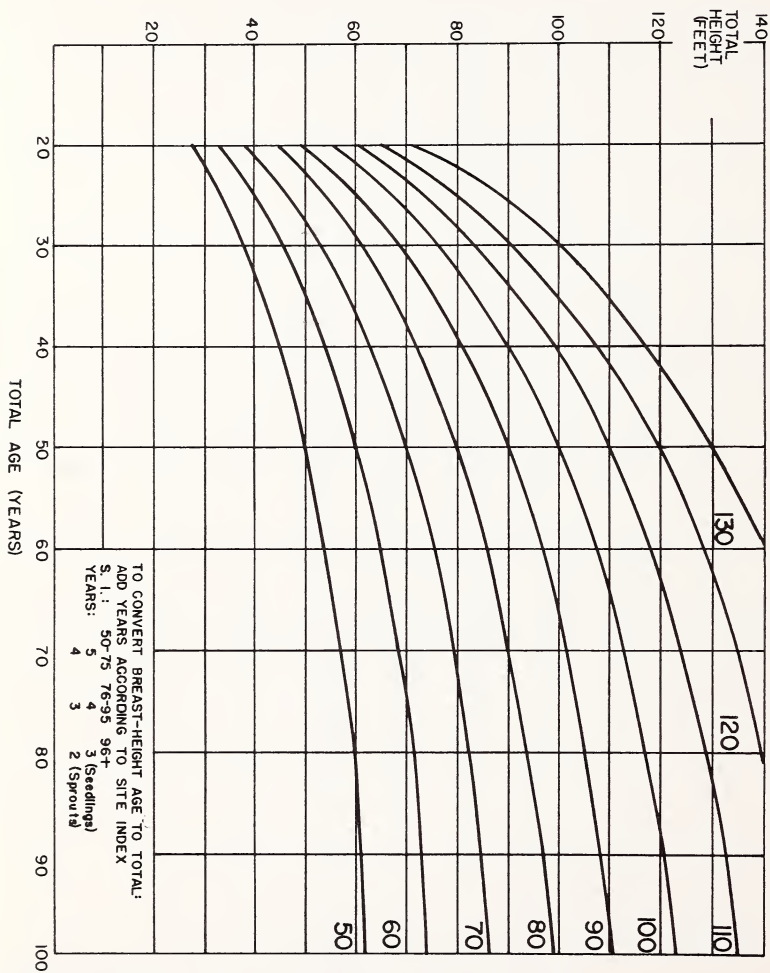
SOURCE: BROADFOOT, W.M., & KRINARD, R.M., SO. FOR. EXP. STA.
OCCAS. PAPER NO. 176, 1959.

HEIGHT IN FEET OF AVERAGE DOMINANT TREES, BY SITE INDEX
AT 50 YEARS, IN CENTRAL STATES REGION.



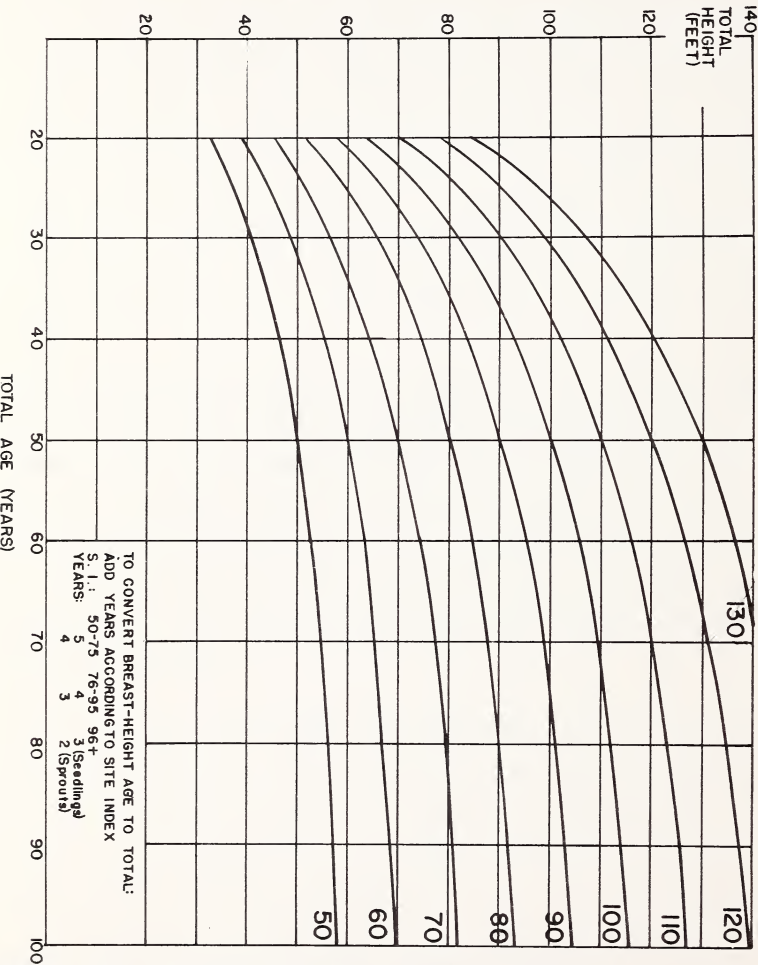
SOURCE: KELLOGG, L.E., SITE INDEX CURVES FOR PLANTATION BLACK
WALNUT, CENTRAL STATES REGION, CENTRAL STATES FOR.
EXP. STA. NOTE # 35, 1939.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN APPALACHIAN MOUNTAIN AREAS.



SOURCE: BECK, D.E., S.E.F.E.S. RES. NOTES NO. 180, OCT. 1962.

HEIGHT IN FEET OF AVERAGE DOMINANT & CODOMINANT TREES, BY SITE INDEX AT 50 YEARS, IN COASTAL PLAIN AND PIEDMONT AREAS, IN NATURAL RANGE OUTSIDE MOUNTAIN AREAS.



SOURCE: BECK, D.E., SE.F.E.S. RES. NOTES NO. 180, OCT. 1962.
 MCCARTHY, E.F., U.S.D.A. TECH. BULL. NO. 356, 1933.

Figure 36.--YELLOW-POPLAR

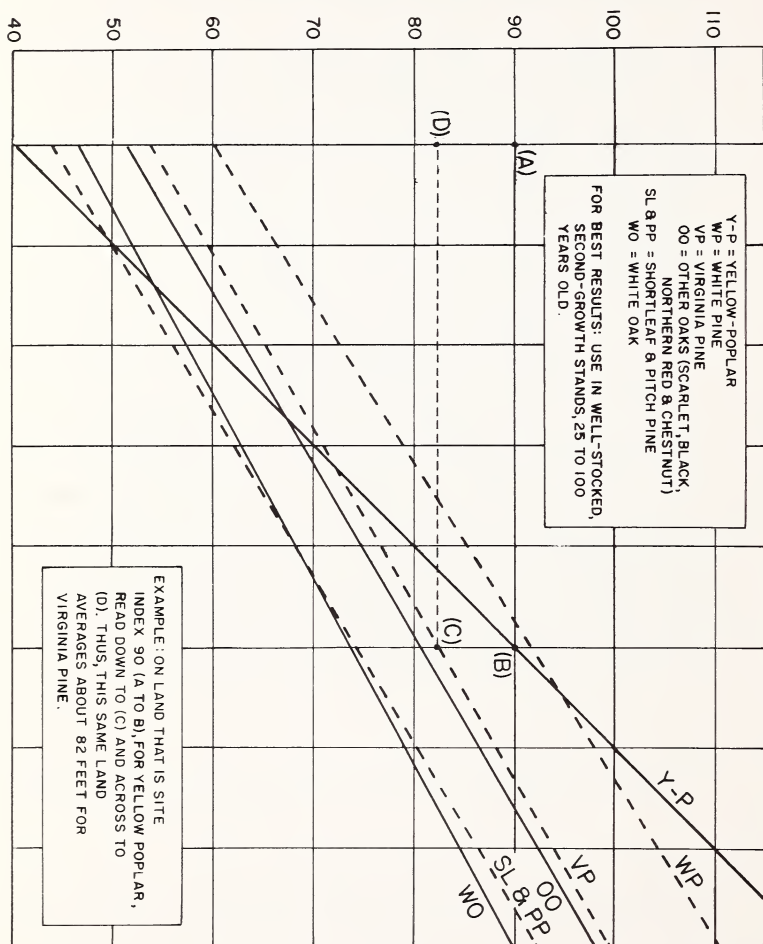
SITE INDEX COMPARISONS FOR SOME FOREST SPECIES

Determination of site index is a problem where several species are growing on the same land, where the land may be bare, where stocked with very young stands or very old remnant stands, or where the species for which site index is desired is not present. Under such circumstances, the ideal way to obtain site index is by determining the soil-site relationship. However, this may require as many studies as there are species, and each study requires considerable time and effort.

One quicker and easier method is to relate the site indices of several species to one another. Thus, if the site index can be determined for one species, either from trees or by soil-site studies, the site indices of the other species can also be determined. For convenience, published comparisons for some species are shown on the following pages.

Of course, there are limitations in the use of such comparisons. For example, we must assume that the growth of each of the several species is related to the same basic factors of site. In addition, the method cannot be used to determine site index of a species on sites on which the species does not normally occur. Finally, application of such comparisons should be restricted to stands and sites similar to those used in deriving the same.

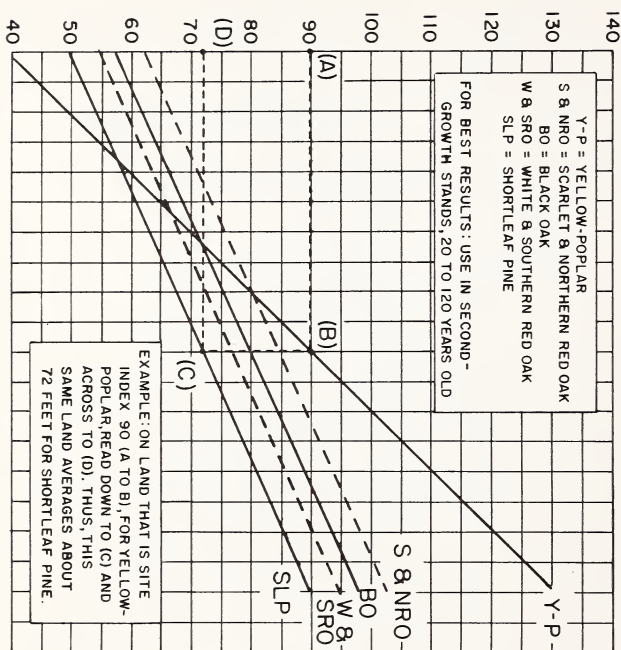
SITE INDEX (HEIGHT IN FEET AT TOTAL AGE OF 50 YEARS)



SOURCE: DOOLITTLE, W. T., SITE INDEX COMPARISONS FOR SEVERAL FOREST SPECIES IN THE SOUTHERN APPALACHIANS, SOIL SCI. SOC. AMER. PROC. 22: 455-458, ILLUS.

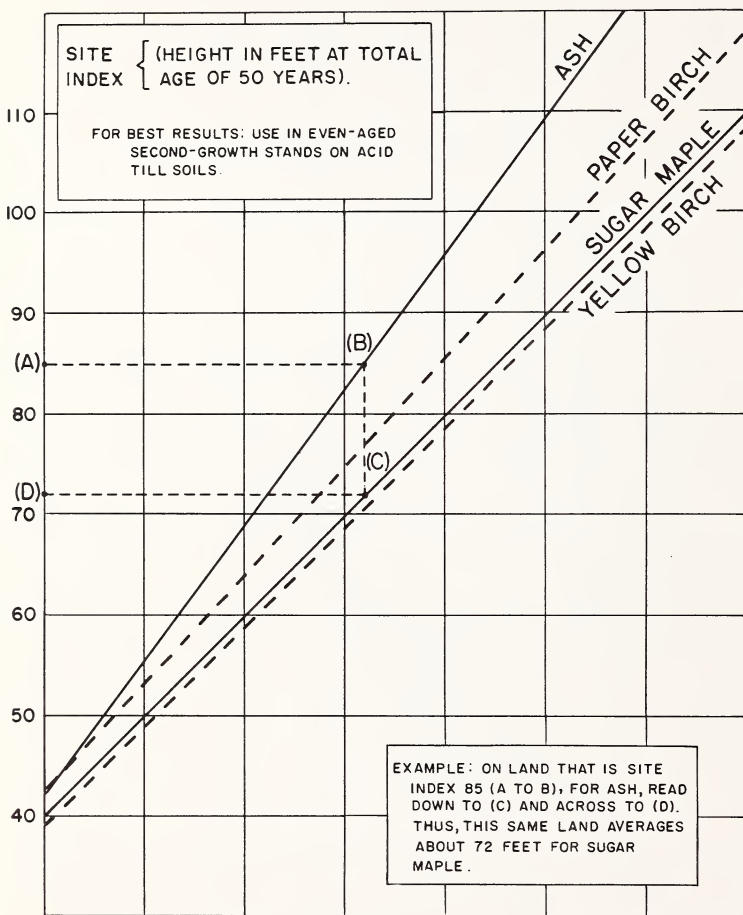
FOR 10 SPECIES IN SOUTHERN APPALACHIAN REGION.

SITE INDEX (HEIGHT IN FEET AT TOTAL AGE OF 50 YEARS)



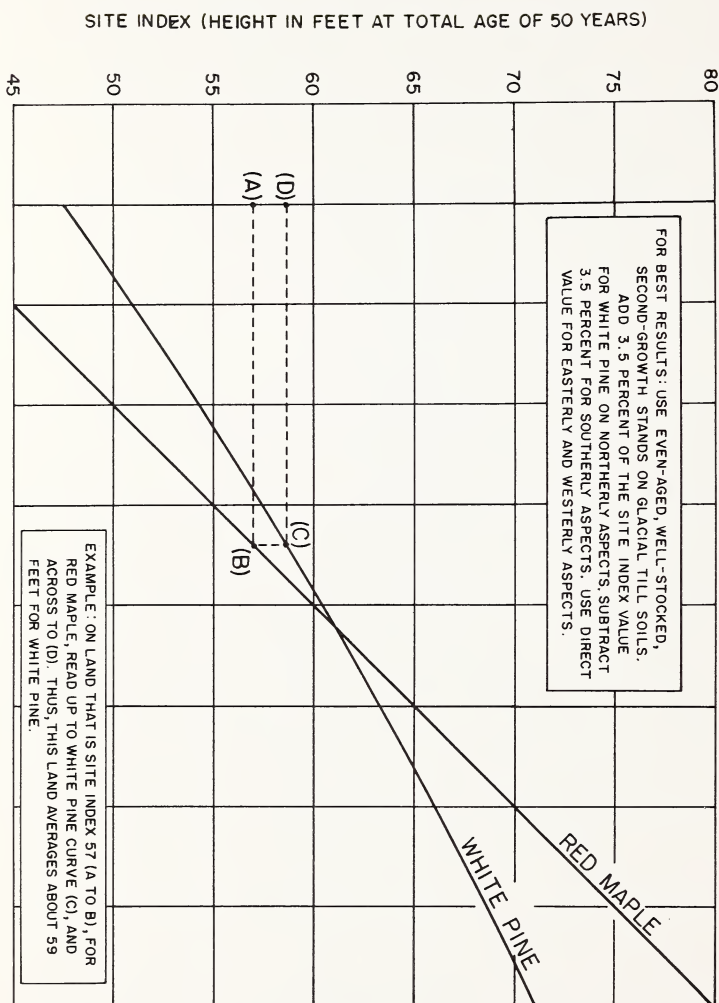
SOURCE: OLSON, JR., D. F., & DELLA-BIANCA, L., SEFES STA. PAPER NO. 104, OCT. 1959.

FOR 7 SPECIES IN PIEDMONT AREAS OF VIRGINIA AND THE CAROLINAS.



SOURCE: CURTIS, R. O., & POST, B. W., NEFES STA. PAPER NO. 171, 1962.

FOR FOUR NORTHERN HARDWOODS IN VERMONT.



SOURCE: FOSTER, R. W., FOREST SCIENCE: 5 (3) 1959. pp. 279-290.

FOR WHITE PINE AND RED MAPLE IN NEW ENGLAND AND NEW YORK.





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